

**DETERMINING THE PRESSURE OF FORMATION FLUID  
IN EARTH FORMATION SURROUNDING A BOREHOLE**

**ABSTRACT**

A method for determining formation fluid pressure in earth formation surrounding a borehole wall uses a downhole probe coupled to a variable-volume cavity. The probe is driven into contact with formation at the borehole wall. The method includes expanding the volume of the cavity during a first period of time to establish fluid communication between tool fluid and formation fluid, by withdrawing a minimal amount of fluid from the formation. During a second period of time the tool pressure is allowed to equilibrate to formation pressure. When pressure equilibrium is established, formation fluid pressure is set equal to tool pressure. A preferred embodiment includes terminating expanding the volume of the cavity on detecting a break in the mud cake seal. An associated formation pressure tester tool includes an elongated body; a probe defining a formation fluid inflow aperture, an electromechanical assembly defining a variable-volume cavity, a pretest flow line coupling the aperture to the cavity, a pressure sensor coupled to the cavity; and downhole electronic means for controlling the expansion of the volume of the cavity.